What is Claimed Is:

1. A digital broadcasting system for transmitting a broadcast signal, said broadcast signal being transmitted from an earth station, comprising:

a satellite for receiving said broadcast signal from said earth station and for transmitting a satellite signal comprising said broadcast signal on a first carrier frequency; and

a terrestrial repeater for receiving said satellite signal and for generating and transmitting a terrestrial signal from said satellite signal comprising said broadcast signal on a second carrier frequency that is different from said first carrier frequency, said terrestrial signal being modulated by said terrestrial repeater in accordance with a multipath-tolerant modulation technique.

2. A system as claimed in claim 1, wherein said terrestrial repeater is operable to modulate said terrestrial signal using at least one of adaptive equalized time division multiplexing, coherent frequency hopping adaptively equalized time division multiplexing, multicarrier modulation, and code division multiplexing.

3. A system as claimed in claim 1, wherein said satellite signal is modulated in accordance with at least one of time division multiplexing and code division multiplexing.

4. A system as claimed in claim 1, wherein said terrestrial repeater is operable to modulate said terrestrial signal using multicarrier modulation.

5. A system as claimed in claim 4, wherein said terrestrial repeater is operable to receive said satellite signal and to demodulate said satellite signal into a baseband signal prior to modulating said baseband signal using multicarrier modulation.

6. A system as claimed in claim 1, wherein said satellite signal is assigned a first code division multiple access channel code and said terrestrial signal is assigned a second code division multiple access channel code.

7. A system as claimed in claim 1, further comprising a second satellite, said second satellite being operable to receive said broadcast signal from said earth station and to

transmit a second satellite signal comprising said broadcast signal on said first carrier frequency and delayed by a predetermined period of time with respect to the transmission of the first satellite signal.

8. A terrestrial repeater for retransmitting satellite signals to radio receivers, comprising:

a terrestrial receiver for receiving said satellite signals; and

a terrestrial waveform modulator for generating terrestrial signals from said satellite signals, said terrestrial signals being modulated by said terrestrial waveform modulator in accordance with multicarrier modulation;

wherein said satellite signals are transmitted from a satellite using a first carrier frequency, and said terrestrial waveform modulator is operable to transmit said terrestrial signals to said radio receivers using a second carrier frequency that is different from said first carrier frequency.

9. A terrestrial repeater as claimed in claim 8, wherein said terrestrial waveform modulator comprises:

a time division demultiplexer for demultiplexing said satellite signals from a serial time division multiplexed bit stream into a plurality of parallel bit streams; and

an inverse fast Fourier transform device for generating a digital analog signal comprising a plurality of discrete Fourier transform coefficients.

10. A method for converting a time division multiplexed bit stream into a plurality of multicarrier modulated signals at a terrestrial repeater, comprising the steps of:

receiving said time division multiplexed bit stream from a satellite;

dividing said time division multiplexed bit stream into a plurality of parallel bit paths;

representing each of a predetermined number of bits in each of said plurality of bit paths as a symbol comprising an imaginary component and a real component;

providing said symbols to parallel inputs of an inverse Fourier transform converter as complex number frequency coefficient inputs to generate outputs which comprise modulated, narrow-band, orthogonal carriers; and

transmitting said modulated, narrow-band, orthogonal carriers from said terrestrial repeater.

11. A method as claimed in claim 10, further comprising the step of generating a guard interval for said carriers.

12. A method as claimed in claim 11, wherein said generating step comprises the steps of:

allocating a fraction of the symbol period corresponding to the duration of each of said symbols to guard time; and

reducing the duration of each of said symbols.

13. A method as claimed in claim 12, wherein said reducing step comprises the steps of:

storing said outputs of said inverse Fourier transform converter in a memory device every said symbol period; and

reading from said memory device after each said fraction of said symbol period has elapsed.

14. A method as claimed in claim 11, wherein said generating step further comprises the step of filling said guard interval with a subset of said outputs of said inverse Fourier transform.

15. A method as claimed in claim 10, further comprising the step of inserting a synchronization symbol every predetermined number of said symbol periods to synchronize a sampling window corresponding to said fraction of said symbol period with respect to said carriers every said symbol period at a receiver for said plurality of multicarrier modulated signals.

16. A method as claimed in claim 10, further comprising the step of puncturing said time division multiplexed bit stream to reduce the total bandwidth associated with said carriers.

17. A method as claimed in claim 16, wherein said puncturing step comprises the step of selectively eliminating bits from said time division multiplexed bit stream prior to providing said symbols to said parallel inputs of said inverse Fourier transform converter.

18. A digital broadcasting system for transmitting a broadcast signal, said broadcast signal being transmitted from an earth station, comprising:

a first satellite configured to receive said broadcast signal from said earth station and to transmit a time division multiplexed satellite signal comprising said broadcast signal;

a terrestrial repeater configured to receive said satellite signal and to generate and transmit a terrestrial signal from said satellite signal comprising said broadcast signal, said terrestrial signal being modulated by said terrestrial repeater in accordance with at least one of adaptive equalized time division multiplexing, coherent frequency hopping adaptive equalized time division multiplexing, code division multiplexing, and multicarrier modulation.

19. A digital broadcasting system as claimed in claim 18, wherein said satellite signal is transmitted using a first carrier frequency, and said terrestrial signal is transmitted using a second carrier frequency that is different from said first carrier frequency.

20. A digital broadcasting system as claimed in claim 18, further comprising at least one radio receiver configured to receive said satellite signal and said terrestrial signal, said radio receiver comprising a diversity combiner for generating an output signal from at least one of said satellite signal and said terrestrial signal.

21. A digital broadcasting system as claimed in claim 18, further comprising a second satellite configured to receive said broadcast signal from said earth station and to transmit a second time division multiplexed satellite signal comprising said broadcast signal, said second satellite signal being delayed with respect to said first satellite signal by a selected time delay.

22. A digital broadcasting system as claimed in claim 21, further comprising at least one radio receiver configured to receive said first satellite signal, said second satellite signal and said terrestrial signal, to delay at least one of said first satellite signal and said terrestrial signal in accordance with said selected time delay, and to generate an output signal from at least one of first satellite signal, said second satellite signal and said terrestrial signal.

23. A digital broadcasting system as claimed in claim 22, wherein said radio receiver comprises a diversity combiner and a switched combiner, said radio receiver using said diversity combiner to perform maximum likelihood decision combining of said first satellite

signal and said second satellite signal and said switched combiner to select between the output of said diversity combiner and said terrestrial signal depending on which of said output of said diversity combiner and said terrestrial signal has the least number of bit errors.

24. A digital broadcasting system as claimed in claim 22, wherein said radio receiver comprises a diversity combiner to perform maximum likelihood decision combining of said first satellite signal, said second satellite signals and said terrestrial signal.

25. A receiver for receiving a broadcast signal in a combined satellite and terrestrial digital broadcasting system, comprising:

a first receiver arm for receiving a first satellite signal transmitted from a first satellite on a first carrier frequency, said first satellite signal comprising said broadcast signal and being modulated in accordance with at least one of time division multiplexing and code division multiplexing, said first receiver arm comprising a demodulator for recovering said broadcast signal;

a second receiver arm for receiving a terrestrial signal transmitted from a terrestrial station on a second carrier frequency, said terrestrial signal comprising said broadcast signal and being modulated in accordance with at least one of adaptive equalized time division multiplexing, coherent frequency hopping adaptive equalized time division multiplexing, code division multiplexing, and multicarrier modulation, said second receiver arm comprising a demodulator for recovering said broadcast signal; and

a combiner for generating an output signal from at least one of said third satellite signal and said terrestrial signal.

26. A receiver as claimed in claim 25, further comprising:

a third receiver arm for receiving a second satellite signal from a second satellite that is delayed with respect to said first satellite signal in accordance with a selected time delay, said second satellite signal comprising said broadcast signal and being modulated in accordance with the corresponding at least one of time division multiplexing and code division multiplexing employed by said first satellite signal, said third receiver arm comprising a demodulator for recovering said broadcast signal; and

a delay device for delaying said first satellite signal in accordance with said selected time delay, said combiner being operable to generate an output signal from at least one of said first satellite signal, said second satellite signal and said terrestrial signal.

27. A method for transmitting a broadcast signal to a radio receiver, comprising the steps of:

modulating said broadcast signal for transmission to said radio receiver as a first signal in accordance with at least one of time division multiplexing and code division multiplexing;

transmitting said first signal to said radio receiver from a first satellite on a first carrier frequency;

modulating said broadcast signal at a terrestrial station for transmission to said radio receiver as a second signal in accordance with at least one of adaptive equalized time division multiplexing, coherent frequency hopping adaptive equalized time division multiplexing, code division multiplexing, and multicarrier modulation; and

transmitting said second signal to said radio receiver from said terrestrial station on a second carrier frequency that is different from said first carrier frequency.

28. A method as claimed in claim 27, wherein the step of modulating said broadcast signal as said second signal comprises the steps of:

receiving said first signal at said terrestrial station; and

performing baseband processing of said first signal prior to modulating in accordance with at least one of adaptive equalized time division multiplexing, coherent frequency hopping adaptive equalized time division multiplexing, code division multiplexing, and multicarrier modulation.

29. A method as claimed in claim 28, further comprising the step of receiving said first signal and said second signal at said radio receiver.

30. A method as claimed in claim 29, further comprising the step of demodulating each of said received first signal and said received second signal to remove said respective modulations and to recover a first recovered broadcast signal and a second recovered broadcast signal, respectively.

31. A method as claimed in claim 30, further comprising the step of generating an output broadcast signal from said first recovered broadcast signal and said second recovered broadcast signal.

32. A method as claimed in claim 31, wherein said generating step comprises the step of performing maximum likelihood combining of said first recovered broadcast signal and said second recovered broadcast signal.

33. A method as claimed in claim 27, further comprising the steps of:

modulating a broadcast signal for transmission to said radio receiver as a third signal in accordance with at least one of time division multiplexing and code division multiplexing;

transmitting said third signal to said radio receiver from a second satellite, said transmission being delayed with respect to the transmission of said first signal by a predetermined period of time.

34. A method as claimed in claim 33, further comprising the steps of:

receiving said first signal, said second signal and said third signal at said radio receiver;

demodulating each of said first signal, said second signal and said third signal to remove said respective modulations and to recover a first recovered broadcast signal, a second recovered broadcast signal and a third recovered broadcast signal, respectively; and

generating an output broadcast signal from at least one of said first recovered broadcast signal, said second recovered broadcast signal and said third recovered broadcast signal.

35. An indoor reinforcement system for receiving satellite signals transmitted by a digital broadcasting system using a radio receiver located indoors, comprising:

a line of sight antenna for receiving line of sight satellite signals;

a radio frequency front-end unit connected to said line of sight antenna for passing frequency spectrum comprising said satellite signals with low noise;

an indoor amplifier;

a cable for connecting said radio frequency front-end unit to said indoor amplifier; and

an indoor re-radiating antenna connected to said indoor amplifier, said indoor re-radiating antenna having a power level selected to be sufficiently high to achieve satisfactory indoor reception of said satellite signals at radio receivers at indoor locations where line of sight reception of said satellite signals is not possible and sufficiently low to prevent interference by said satellite signals transmitted between said indoor re-radiating antenna and said line of sight antenna.

36. An indoor reinforcement system as claimed in claim 35, wherein said satellite signals are characterized by a selected symbol period, and the duration of the transmission of said satellite signals between said line of sight antenna and said indoor re-radiating antenna is maintained to be less than a selected amount of said symbol duration by limiting the length of said cable.

37. An indoor reinforcement system as claimed in claim 36, wherein said duration of the transmission of said satellite signals between said line of sight antenna and said indoor re-radiating antenna is no more than between 20 percent and 25 percent of said selected symbol period.

38. A reinforcement system for receiving satellite signals transmitted by a digital broadcasting system using a radio receiver located outdoors, wherein said satellite signals are characterized by a selected period, said reinforcement system comprising at least two terrestrial repeaters, said terrestrial repeaters being characterized by a height h and being spaced apart by a distance d, the slant distance $(d^2 + h^2)^{1/2}$ from one of said terrestrial repeaters to said radio receiver being selected to limit a delay in reception of said satellite signals at said radio receiver from one of said terrestrial repeaters to between 20 percent and 25 percent of said symbol period.

39. A digital broadcasting system for transmitting a broadcast signal to a radio receiver, said broadcast signal being transmitted by an earth station, comprising:

a satellite configured to receive said broadcast signal from said earth station and to transmit a satellite signal comprising said broadcast signal to said radio receiver on a first carrier frequency; and

at least one terrestrial repeater configured to receive said satellite signal and to generate and transmit a terrestrial signal from said satellite signal comprising said broadcast signal to said radio receiver on a second carrier frequency that is different from said first carrier frequency, wherein said satellite signal and said terrestrial signal are each modulated using a multipath-tolerant modulation technique.

40. A system as claimed in claim 39, wherein said satellite signal is modulated in accordance with code division multiplexing.

41. A system as claimed in claim 39, wherein said terrestrial signal is modulated in accordance with at least one of adaptive equalized time division multiplexing, coherent frequency hopping adaptive equalized time division multiplexing, code division multiplexing, and multicarrier modulation.